MARKET STUDY SERIES

A BRIEF FOR CANADIAN MANAGERS

BUSINESS OPPORTUNITIES
IN
AUSTRALIAN WASTEWATER TREATMENT
AND
SEWAGE SLUDGE HANDLING
AND DISPOSAL

CANADIAN TRADE COMMISSIONER SERVICE – AUSTRALIA
EXTERNAL AFFAIRS AND
INTERNATIONAL TRADE CANADA

SCOPE OF REPORT

This report is designed to alert Canadian companies, with relevant technologies and equipment, to opportunities in the Australian market generated by greater awareness in both public bodies and among the populace in general of the requirement to adequately treat wastewater and sewage.

Multi-billion dollar projects are currently being devised and these will undoubtedly offer real opportunities for Canadian consultants and equipment manufacturers.

The report provides an overview of the current situation in the treatment of wastewater and sewage, and future projections of amounts to be treated are related to requirements for technology and equipment.

The various local public bodies are identified, and a list of potential local partners is provided.

BUSINESS OPPORTUNITIES IN AUSTRALIAN WASTEWATER TREATMENT AND SEWAGE SLUDGE HANDLING AND DISPOSAL

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OVERVIEW

Growing environmental awareness in Australia has fostered a climate which enables governments to take steps to improve the effects on the environment of their required approvals and actions.

This is especially so with respect to wastewater treatment and sewage sludge disposal, the potentially adverse effects of which have been brought to the country's attention by the severe pollution of Sydney's beaches as the result of the dumping for decades of barely treated liquid effluent and untreated sludge through nearshore ocean outfalls.

Wastewater Treatment and Disposal

The technologies used to treat wastewater in Australia range from zero treatment before ocean discharge to sophisticated tertiary treatment with biological or chemical nutrient stripping.

* zero treatment prior to discharge via ocean outfall is permitted to some communities along the east coast.

* primary sedimentation prior to discharge via ocean outfall is allowed in a number of places; notably, Sydney (NSW), from which 1129 ML/d are emitted on dry days into the Tasman Sea via near-shore outfalls at the three major plants; and Geelong (Vic), which discharge 50 ML/d into Bass Strait.

* lagoons as the sole means of treatment prior to use of the effluent for irrigation of a wide variety of crops are common in Victoria. In Melbourne, the Werribee Farm plant treats 470 ML/d by ponding, irrigation and ultimate discharge into Port Phillip Bay (which adjoins Bass Strait). Elsewhere in Victoria, there are 60 individual systems with a total design capacity of 275 ML/d.

* Secondary treatment in its various forms is common, being the required minimum level of treatment in NSW outside Sydney, and in Queensland. In Victoria, the major Melbourne South-Eastern Purification Plant (580 ML/d activated sludge) uses it, as do about half of the 145 plants operated by local authorities outside Melbourne. Thirty nine of these are trickling filter plants, which require upgrading.

* tertiary treatment, which in Australia usually means effluent "polishing", often by use of post-secondary maturation (retention) ponds for "natural" disinfection prior to discharge, is used to meet bacteriological effluent standards at many coastal plants. Chlorine dioxide is replacing chlorine as the chemical disinfectant of choice.

* Nutrient stripping of secondary effluents is coming into use as regulatory agencies respond to public concerns about the release of nitrogen and phosphorus into the environment. At Bendigo (Vic), installation of a 25 ML/d biological nitrogen reduction system is underway. The major tertiary plant at Canberra (Australian Capital Territory, population 270,000) has used high alkalinity (lime) for nutrient reduction for a number of years, and several new plants in other places are being equipped for this process.

Sludge Handling and Disposal

Most treatment facilities in Australia dispose of sludge by lagooning, thickening, drying, and landfilling or surface spreading.

Large quantities of sludge are being stored at sewage treatment sites awaiting the development of economically viable uses, as is the case at Melbourne's South-Eastern Purification Plant (which produces 65,000 dry tonnes/year).

In Sydney, about 30% of the estimated 120 dry solid tonnes per day (dst/d) of sludge entering the large, coastal plants is captured. The remainder, about 84 dst/d, is discharged into the Tasman sea via in-shore outfalls.

Small amounts are used for landscaping, soil treatment and land reclamation, but the beneficial re-use of sludge in eastern Australia is minimal.

Research and development is underway in attempts to find useful ways to dispose of sludge. Numerous government bodies are conducting composting trials, while others are experimenting with a range of conversion technologies.

For example, supported by a commitment of A$47m. from the NSW government, the Sydney Water Board issued in November 1989 a worldwide request for tenders for innovative turn-key disposal processes and has pledged to consider any and all ideas and technologies.

The principal result of this consciousness is a public commitment to ensure that future activities in the wastewater treatment and sludge handling areas are benign and that problems like those of Sydney are corrected in the future.

Technologies used in future will be those that reduce the actual or perceived adverse environmental impact the treatment and disposal of wastewater generate, and which increase the technical and economic feasibility of re-using effluent.

Advanced forms of secondary and tertiary treatment will be emphasised, including nutrient reduction, all with highly effective disinfection targeting viral as well as bacterial agents.

The use of retention (maturation) ponds to "naturally" disinfect sewage will decrease as the survival of viruses and odour becomes public concern.

Increased attention will be paid to the exclusion of trade and industrial wastes from the influent stream, and to a reduction of groundwater infiltration into sewers.

The disposal of treated effluent from coastal facilities in areas outside Sydney and Melbourne will use combinations of re-use and ocean outfalls. Such will become the fail-safe option rather than the sole means of disposal.

Objective of this Study

This study, of the situation and prospects in the eastern, coastal States of Queensland, New South Wales and Victoria, which contain much of the 16.7 million population of Australia, has been undertaken to assess the extent to which the evolutionary changes occurring in Australian approaches to wastewater and sewage sludge management are creating potential opportunities for Canadian businesses to provide some of the services, technologies and equipment needed.

Within these States, the areas on which this report concentrates are as follows.

In the State of New South Wales:

metropolitan Sydney, where 97 percent of the 1989 population of 3.7 million was provided with sewerage service by the Water Board;

coastal communities experiencing rapid development growth; south of Sydney, on the Tasman Sea; and north along the coast to the Queensland border.

In the State of Victoria:

Melbourne, where in 1989 the Metropolitan Board of Works was providing sewerage service to 2.5 million people. This number is projected to rise to 3.2 million by the year 2001;

the non-metropolitan communities of the State, where 142 separate water boards supply sewerage services to 2.8 million people.

In the State of Queensland:
coastal communities located in the rapidly developing southern, coastal fringe south of and north of Brisbane.

Information in this report was compiled from data obtained through visits to the areas studied, interviews with government officials and others, and access to many published and unpublished sources. The report provides information on the following subjects:

Estimates of the amounts of wastewater and sludge (where deemed to pose a disposal problem) that will create a future demand for equipment and services.

Treatment technologies in current use and those planned for new and upgraded facilities required to meet population growth and to satisfy environmental criteria.

The incidence of adverse environmental and health effects caused by the treatment and disposal methods currently used and known solutions to overcoming these.

Technologies which are planned to be implemented to solve and avert problems and which will be acceptable to both the public and the government.

Synopses of the potential markets for equipment and services, and the names, addresses, telephone and fax numbers of government officials who regulate entry to these markets, by region.

Major buyers and suppliers of equipment and services in the wastewater and sludge treatment industries, especially those that are potential joint venture partners for Canadian exporters.

Australian Customs charges on imported equipment.

Major conferences, trade shows and exhibitions in Australia during 1990 and 1991.

Import trade publications and periodicals.

The report concludes that there is and will be a significant demand for technologies and equipment for secondary treatment; for advanced wastewater treatment providing the option of re-use of effluent; and for sewage sludge treatment and disposal through re-use. In passing, it is noted that government attention to problems of trade wastes and hazardous industrial wastes entering the sewers, particularly in Sydney and Melbourne, will probably increase the demand for treatment technologies in this area also.

MARKETING STRATEGY FOR CANADIAN COMPANIES

Overseas companies wishing to enter the Australian market need to take three courses of action:

* establish their credentials to supply, service, and maintain their products;

  establish an Australian identity through a local, qualified agent;

  establish a business arrangement with an Australian joint-venture partner.

1.0 INTRODUCTION

This report is designed to identify business opportunities in Australian wastewater treatment, and sewage sludge handling and treatment, to assist Canadian companies to identify areas of opportunity in Australia, to evaluate prospects for business in those areas, and to assess the benefits from expected marketing expenditures.

1.1 Background

Most of the Australian population of 16.7 million lives in the southern and central coastal regions of eastern Australia abutting Bass Strait and the Tasman Sea in the south (Vic and southern NSW), and the South Pacific Ocean in the centre (central and northern NSW and southern Qld).

Within this region lie the metropolitan areas of Sydney (NSW) and Melbourne (Vic) with populations served by sewerage, of 3.7 and 2.5 million respectively.

The areas of non-metropolitan New South Wales and Queensland included are found on the coastline which is subject to rapid development and consequent pressures on available resources. Included are one water board (Hunter, 100 miles north of Sydney); three city governments (Coffs Harbour in northern NSW; Gold Coast and Caloundra in Qld); and 6 shires (4 in NSW and 2 in Qld).

The non-metropolitan areas of Victoria addressed in this report contain a population of about 2.8 million who are provided with sewerage services by 142 local councils and water boards.

Recent events and ongoing trends in the focus region have created a climate in which environmental aspects of wastewater treatment and sewage sludge handling and disposal have come under close scrutiny by the public and governments.

The catalyst has been an ongoing series of public revelations of the contamination of Sydney's ocean bathing beaches by primary-treated liquid effluent (1,183 million litres/day [ML/d] in dry weather) accompanied by poorly-screened floatables and undigested sludge from cliff-face ocean outfalls. Subsequent investigations have detected viral contamination of bathing waters and accumulations of heavy metals and organochlorines in marine species as far up the food-chain as fish taken by anglers near the outfalls.

Public and political response has been supportive of more environmentally benign treatment and disposal alternatives for wastewater and sludge than those now in use.

Public support has grown for at least secondary, but preferably advanced wastewater treatment providing the option of re-using rather than disposing of liquid effluent and sewage sludge.

Public authorities throughout the areas included in this study, long-term proponents of using more advanced treatment and disposal methods, have moved quickly in support of the change in public sentiment, proposing long-term programs using the most modern technologies. The most ambitious of these is the Sydney Water Board which has recently announced a 20-year, A$6 billion program to upgrade its entire collection and treatment systems to acceptable standards. It has also advertised internationally for tenders for turnkey solutions in the treatment of its sludge production, expected to reach 260 tonnes/day by 1996.

1.2 Information Provided

The following information is provided:

* An estimate of present and future quantities of wastewater and sewage sludge treated and disposed of in selected regions in the eastern states of Queensland (Qld), New South Wales (NSW), and Victoria (Vic). The regions chosen because they are heavily populated or are subject to rapid population growth, were Sydney and coastal NSW shires to its south, and north to the Qld border; Melbourne and non-metropolitan Victoria;and Qld coastal shires to the south and north of Brisbane.

* Identification of treatment technologies and disposal methods presently in use and those planned for use.

* Identification of problems in treatment and disposal.

* Evaluation of available technological solutions to these problems, and an assessment of their acceptability to Australian regulatory authorities.

* Estimates of the potential size of the market for equipment and services to achieve these solutions.

* A list of major buyers and suppliers of equipment and services, and of potential joint venture partners for Canadian companies.

* Details of applicable duties or tariffs.

* A list of major, relevant conferences, trade shows and exhibitions in Australia during 1990 and 1991.

* A list of trade publications and periodicals.

* A marketing strategy for Canadian companies planning to enter the Australian market.

Each of these subjects is addressed in the following.

2.0 CURRENT AND PROJECTED SEWAGE TREATMENT SYSTEMS

The information in this report was obtain directly from those responsible for the sewage treatment systems profiled, and from published and unpublished reports and other documents. The profiles are organised by State, since tendering and contractual procedures differ in each State.

The Problems Needing Solution and Opportunities for Suppliers of Services and Equipment headings in each profile identify possible business opportunities for equipment and service companies. Sewerage authority activities unlikely to offer such opportunities are not included.

The Responsible Official headings identify those to whom enquiries about tenders and contracts should be made. Because the tendering processes vary between Sates and between regions within States, local knowledge is important, as is the establishment of business relationships with Australian companies. Of paramount importance to companies seeking to break into the Australian market is the establishment of their corporate and technical credibility with the relevant contracting authorities, and demonstration of their reliability and capability in the servicing of products supplied.

These matters are addressed as part of the recommended approach for Canadian companies wishing to enter the tender system and to seek business in Australia, as set out in the Marketing Strategy section of this report.

Wastewater treatment capacities are expressed in megalitres per dry day (ML/d), shown as current (1989) and projected. Varying projection years between regions reflect differences in planning horizons; where not given, projections were not available.

In most cases, wastewater volumes have been calculated from the "equivalent population" (estimated per person per day production of wastewater) engineering convention in which treatment plant capacities are expressed. This rule-of-thumb figure varies between regions, and is only a rough benchmark: for example, the e.p. used for Sydney is 270 litres/day, whereas the actual daily flow in dry weather is reported to exceed 400 l/d.

Sludge quantities are expressed as dry, solid tonnes per year (t/yr). Where (n/a) appears in place of a quantity it reflects the fact that sludge disposal is not perceived by officials as a problem requiring solutions other than the usual ponding, drying, and land disposal practiced in most places.

2.1 STATE OF NEW SOUTH WALES

2.1.1. Sydney Water Board

The Board's treatment systems are located in four areas.

Status

Sydney Coastal
Wastewater treatment capacity
year 1989 .....1196 ML/d
projected year 2000.....1360 ML/d
Sludge produced
year 1989.....44000 T/yr
projected year 1992.....73000 T/yr
projected year 1996.....95000 T/yr
(Note: the projected increases in sludge production will result from higher capture rates as the coastal plants at Malabar, Bondi and North Head are upgraded and the dumping of sludge into the ocean is phased out.)

Inland
Wastewater treatment capacity
year 1989.....129 ML/d
Sludge produced.....n/a

South Coast
Wastewater treatment capacity
year 1989.....38 ML/d
Sludge produced.....n/a

Blue Mountains
Wastewater treatment capacity
year.....15 ML/d
Sludge produced.....n/a

Population served (total) year 1989.....3.7 million

Wastewater Treatment Plants and Technologies

* The major treatment plants operated by the Sydney Water Board are the coastal plants at Malabar, Bondi, and North Head, all of which discharge primary effluent and digested sludge into the Tasman Sea through near-shore outfalls. These plants suffer wet-weather overloads after 50mm (2 inches) of rainfall, resulting in untreated sewage entering the ocean.

  The New South Wales Government has embarked on a short-term, high-priority program to upgrade these plants to increase the capture of primary sludge and to cease its discharge into the ocean by 1993; and a long-term program, costed at A$6 billion over 20 years, to revamp the sewage collection, transportation, treatment, and disposal system to lower groundwater infiltration and wet-weather overloading and to produce effluent which meets secondary standards.

As part of this program, the Water Board announced in January 1990 that it will spend A$8.4 million to install and test at the Malabar treatment plant an Australian-developed magnetite process (SIRO-FLOC) which will remove more than 90% of the solids from primary sedimentation tanks, producing a secondary-level effluent.

* The inland plants, which serve parts of Sydney's western suburbs, are modern secondary and tertiary (but lacking nutrient removal) treatment facilities which discharge into rivers. The Water Board plans to install nutrient-reduction capability to these plants in the near future.

* The South Coast plants, three providing secondary and, two primary treatment, discharge into the Tasman Sea via near-shore outfalls. They treat effluent from a major industrial region and its environs. One of the plants, at Port Kembla, receives and discharges heavy loads of chemical contaminants from a major steel mill.

* The Blue Mountains plants are in the process of upgrading to tertiary treatment with nutrient stripping to reduce contamination of the receiving waters, small streams flowing into and through a mountainous, major national park and recreational area. The Water Board is presently conducting a trial of membrane purification technology at one of these plants.

Sludge Handling and Disposal

Almost all of the sludge from the major Sydney coastal plants is discharged into the ocean via outfalls, resulting in major contamination of bathing beaches. The Water Board is addressing this problem urgently, and has called for tenders from businesses able to offer disposal solutions which will enable ocean dumping of sludge to cease by 1993.

The problems posed in the re-use of sludge by the presence of heavy metals and other industrial contaminants are being addressed by the imposition of very high "polluter pays" fees for companies that dispose of trade wastes through the sewers. These disincentives to pollute are likely to force businesses to implement effective waste treatment and management programs.

Sludge from the other plants in the Water Board's system is composted or landfilled.

Problems Needing Solutions

Primitive wastewater treatment at the large coastal plants and insufficient capacity to handle wet-weather loads, resulting in the discharge of untreated sewage into the ocean.

Discharge of sludge into the ocean with the liquid effluent, caused by a low capture rate (about 30%) and a lack of alternative disposal options.

Heavy metals and toxic substances in the effluent of the Sydney coastal and South Coast plants, and their accumulation in marine biota.

Serious bacterial and viral contamination of bathing waters by poorly treated and undisinfected effluent from the major coastal plants.

Contamination of streams in the Blue Mountains National Park by effluent from old secondary plants.

Fertilisation of inland receiving waters from plants without nutrient removal capability.

Infiltration of sewers by stormwater due to corrosion of the mains.

Poor flow monitoring caused by the lack of effective digital data collection and telemetry hardware and software.

Insufficient advanced laboratory testing capability due to a shortage of appropriate equipment.

Odor control technologies are urgently needed.

Re-use of treated effluent needs to be addressed and innovative technologies identified or developed.

Opportunities for Suppliers of Services and Equipment

The New South Wales Government and the Sydney Water Board are committed to the total revamping and upgrading of the Sydney metropolitan sewage system over the next 20 years, during which capital expenditures are projected to be A$6 billion (1990 dollars).

From 1990 to 1992, expenditures on programs already identified (such as the sludge treatment tender and the upgrading of the inland and mountain treatment plants) are projected to total $340 million. This amount is certain to rise as new initiatives are announced to tackle the problems listed above, the solution of which will offer many opportunities for businesses to bid on tenders for services and equipment.

Interested companies should establish their qualifications by submitting details to the Water Board.

Responsible Official

The Deputy Managing Director
WATER BOARD: Sydney-Illawarra-Blue Mountains
115-123 Bathurst Street, Sydney 2000
Australia

telephone (international): 61 2 269 6969
fax: 61 2 264 3668

2.1.2 Shoalhaven City (coast, south of Sydney Water Board area)

Status

Wastewater treatment capacity
year 1989.....55 ML/d
projected year 1990.....63 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

This rural municipality, which is experiencing an annual six per cent population growth rate, operates seven treatment plants serving individual communities, with two more to be commissioned in 1990. There are at present no plans for further expansion. All are secondary systems, using a range of standard technologies.

Problems Needing Solutions

Public opposition to an ocean outfall for effluent disposal from one of the new plants could force the New South Wales Department of Public Works (which provides planning, design and construction supervision services through a matching grants scheme to all areas of NSW not controlled by the Sydney Water Board) and the City to adopt a higher degree of treatment than that planned and to provide for effluent re-use.

Infiltration, as in most places, is a problem.

Opportunities for Suppliers of Services and Equipment

There appear to be none at this time.

2.1.3 Hunter District Water Board (central coast, north of Sydney)

Status

Wastewater treatment capacity
year 1989.....103 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

The Hunter Water Board operates 25 sewage treatment plants servicing individual communities in the region. Eleven are activated sludge plants, nine use biological filtration, four are untreated ocean outfalls, and one consists of oxidation ponds. The largest of the untreated outfall plants (43 ML/d) is being upgraded to secondary standard, with an offshore submarine discharge.

Problems Needing Solutions

Toxic and hazardous substances, from industrial emissions are a problem which, while less severe than in Sydney, will have to be addressed in the future.

Upgrades of the old biological filter and the remaining untreated ocean outfall plants will need to be done in the future.

Sludge disposal will become a problem soon and alternatives to land disposal will need to be found. As is the Melbourne Board of Works, the Hunter Board is closely watching events in Sydney.

Opportunities for Suppliers of Services and Equipment

For companies that can qualify for inclusion on the Hunter Water Board's tender list, there will be future opportunities for contracts relating to plant upgrading and sewage disposal.

Although the timing and expected budgets of these activities are not presently known, prospective tenderers should establish links in Australia and should approach the Hunter Water Board.

Responsible Official

The Contracts Officer, Purchasing Section
Hunter Water Board
P.O. Box 5171B
Newcastle West, New South Wales 2302
Australia
telephone (international): 61 49 267 267

2.1.4 Great Lakes Shire (central coast, north of Hunter district)

Status

Wastewater treatment capacity
year 1989.....9 ML/d
projected year 1991.....13 ML/d
projected year 1996.....29 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

This Shire includes a number of rapidly developing coastal resort and retirement communities. There are five present plants and an additional one planned for commissioning in 1996. The additional capacity projected for 1996 will comprise 13 ML/d of added and replacement facilities.

The technologies used are extended aeration and trickling filters with discharge directly into the ocean or via rivers.

Problems Needing Solutions

None reported.

Opportunities for Suppliers of Services and Equipment

The estimated turnkey cost of the 1996 system augmentation, excluding site acquisition and preparation, is A$13.75 million.

Companies interested in the possibility of supplying tenders when they are called, should contact the officials below. The NSW Department of Public Works is listed because it is actively involved in all country NSW sewerage projects, through its matching grants program.

Responsible Official

* The Shire Engineer, Great Lakes Shire Council
P.O. Box 450, Forster, New South Wales 2428
Australia
telephone (international): 61 65 546 277
Fax: 61 65 554 672

* The Chief Engineer, NSW Public Works Department
State Office Block, 74-90 Phillip Street
Sydney, NSW 2000
Australia
telephone (international): 61 2 228 4444
Fax: 61 2 251 3317

2.1.5 Coffs Harbour City (north coast, north of Great Lakes)

Status

Wastewater treatment capacity
year 1989.....16 ML/d
projected year 1996.....18 ML/d
projected year 2006.....21 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

The city of Coffs Harbour operates four treatment plants using extended aeration and trickling filter technologies. Effluent is "polished" in maturation ponds before discharge into the ocean via near-shore outfalls.

Plans of the City Council and the State Public Works Department for a new coastal plant, using extended aeration and discharging via a headland outfall are being strenuously opposed by a public interest group which is demanding tertiary treatment with nutrient stripping and land-based re-use instead of ocean disposal.

It is likely that the outcome of this debate will be a compromise, with tertiary effluent being produced and discharged into the ocean as the fail-safe alternative to land-based re-use when necessary. The estimated cost of such a system is A$22 million, before the costing of re-use technologies which have yet to be identified.

Since officials state that they will consider any advanced technologies that are effective and practical, Coffs Harbour offers potential for the introduction of new technologies from abroad.

Problems Needing Solutions

Apart from the technological challenge posed by the ongoing debate, there remain other problems to be addressed.

Infiltration of groundwater into the system is a problem requiring solution.

Telemetry hardware and software are needed for system monitoring.

Opportunities for Suppliers of Services and Equipment

There appears to be significant potential for the supply of technical information with respect to technologies applicable to the Coffs Harbour situation, and for the supply of state-of-the-art equipment. Therefore approaches should be made promptly to the appropriate officials.

Responsible Official

* The City Engineer, Coffs Harbour
P.O. Box 155, Coffs Harbour, New South Wales 2450
Australia
telephone (international): 61 66 522 555
fax: 61 66 521 517

* The Regional Manager, North Coast Region
NSW Public Works Department
186 Molesworth Street, Lismore, New South Wales 2840
Australia
telephone (international): 61 66 211 672
fax: 61 66 214 920

2.1.6 Tweed Shire (far north coast, abutting Queensland border)

Status

Wastewater treatment capacity
year 1989.....16 ML/d
projected year 1991.....17 ML/d
projected year 1996.....23 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

Tweed Shire operates three extended aeration and two trickling filter plants, one of which (3 ML/d) is to be phased out in 1991 and replaced by a 4 ML/d extended aeration plant augmentation. The 1996 increase in capacity will be at existing extended aeration plants. Effluent is disinfected by ponding prior to discharge into coastal streams.

A very large additional increase in capacity is likely to be needed by about 1996 to service several proposed coastal resort and residential developments.

Problems Needing Solutions

Disinfection by retention ponds is not very effective in this subtropical climate and will need to be replaced by another means, excluding chlorine, which is not favoured. No costings have been done.

Opportunities for Suppliers of Services and Equipment

Design work and construction supervision are carried out by the NSW Public Works Department. Therefore the best opportunities are in the supply of equipment by companies qualified to tender, by the responsible government agencies.

Responsible Official

* The Shire Engineer, Tweed Shire Council
P.O. Box 816, Murwillumbah, New South Wales 2484
Australia
telephone (international): 61 66 720 400
Fax: 61 66 724 598

* The Regional Manager, North Coast Region
NSW Public Works Department
186 Molesworth Street, Lismore, New South Wales 2840
Australia
telephone (international): 61 66 2111 672
fax: 61 66 214 920

2.1 STATE OF VICTORIA

2.2.1 Melbourne & Metropolitan Board of Works (MMBW)

Status

Wastewater treatment volume
- year 1989.....800 ML/d
- projected year 2001.....1000 ML/d

Sludge produced year 1989.....65000 T/yr

Population serviced
- estimated year 1989.....2.5 million
- projected year 2001.....3.2 million

Wastewater Treatment Plants and Technologies

Two major sewage treatment works service Melbourne:

* the Werribee Farm, a land treatment (soil and grass filtration) and 30-day retention lagoon system with an average daily flow of 470 ML discharged into Port Phillip Bay (contiguous to Bass Strait);

* the South-Eastern Purification Plant (SEPP), an activated sludge treatment plant with chlorine disinfection in summer only, now discharging about 330 ML/d to Bass Strait via a 65 km pipeline. Design capacity is 580 ML/d, providing for the projected increase in flow to the year 2001.

Sludge Handling and Disposal

Melbourne's sludge is ponded, dried and stored at the South-Eastern Purification Plant, awaiting suitable disposal technologies.

Problems Needing Solutions

Sludge treatment and disposal. At present, under Victorian Health Department regulations, digested sludge can be used for various purposes after two years retention on the site. The Board of Works is seeking suitable alternative means to treate and dispose of the approximate 65,000 tonnes of sludge produced yearly at the South-Eastern Purification Plant. To this end, a series of composting trials are underway, and the Board is monitoring events elsewhere, especially the progress of the Sydney Water Board, which recently called for international tenders on technologies to dispose of its sludge.

Heavy metals and toxic substances. Industrial treatment methods are required to reduce the introduction of these into the sewers. The Board of Works assists in implementing the State Government's 1986 Industrial Waste Strategy, which

recommends waste avoidance and reduction, recycling and reclamation as preferred waste management methods, by funding research and development through an Industrial Waste Grants Scheme.

Odor control at the Werribee Farm is an ongoing problem for which the Board of Works is actively seeking solutions.

Infiltration. In common with all other sewerage systems, infiltration of groundwater is a problem requiring economically feasible solutions.

Opportunities for Suppliers of Services and Equipment

Because the Melbourne & Metropolitan Board of Works carries out most of its capital works programs using its own personnel and other resources, the use of external technical services is limited. However, in the above problem areas, there appear to be opportunities which can be developed by careful approaches to the MMBW or other authorities. In the case of industrial wastes, affected industries are also included since responsibility for treatment is now being placed on them.

Definite potential exists for the provision of equipment by companies that become eligible for the Board's tender system by demonstrating their ability to supply and service equipment, especially in the problem areas above, in which Australian capacity appears to be limited.

Responsible Official

The MMBW official to whom inquiries should be directed is

Assistant General Manager Systems Development
Melbourne & Metropolitan Board of Works
625 Little Collins Street
Melbourne 3000
Australia

Telephone (international): 61 3 620 0221

2.2.2 None-metropolitan (country) State of Victoria

Status

Wastewater treatment capacity
year 1989.....700 ML/d
Sludge produced year 1989.....n/a
Number of treatment plants year 1989.....145

Wastewater Treatment Plants and Technologies

Most of the 145 treatment plants in non-metropolitan Victoria serve small communities. Sixty of the plants, with total design capacity of about 375 ML/d, are lagoon systems; 12 communities use activated sludge treatment (90 ML/d); and five use extended aeration (52 ML/d). The remainder use primary treatment, or no treatment at all, with ocean outfalls.

Sludge Handling and Disposal

There are no perceived problems with sludge disposal in non-metropolitan Victoria, but also there is no effective re-use. Most is stockpiled at treatment plants.

Problems Needing Solutions

The dumping by Geelong, a community southwest of Melbourne, of 50 ML/d of primary effluent via an ocean outfall into Bass Strait, is the subject of a public inquiry. The outcome is expected to be an upgrading of the plant to at least secondary treatment.

The Latrobe Valley Water and Sewerage Board (east of Melbourne) has a major problem involving an ocean outfall which dumps 125 ML/d of trade wastes from paper mills into Bass Strait.

Numerous other coastal communities now dump untreated or primary treated effluent into the ocean. Pressure to discontine this practice is mounting, and is likely to result in the Victorian Environmental Protection Authority requiring the upgrading of a number of plants. Details of specific requirements for most plants will be announced sometime in the future.

Opportunities for Suppliers of Service and Equipment

The upgrading of existing wastewater treatment plants becomes more likely as environmental pressures mount. Since opportunities will arise within the autonomous local councils and

water and sewerage boards, it is necessary for prospective tenderers to have had their qualifications accepted by the Victorian Department of Water Resources, the administering agency for the system of State financial grants which supports local governments.

Responsible Official

Prospective tenderers should submit their qualifications to:

Mr Warren Wealands
Senior Engineer
Department of Waster Resources Victoria
2nd Floor
35 Spring Street, Melbourne, 3000
Victoria, Australia
telephone (international): 61 3 651 3917
fax: 61 3 651 3989

2.3 STATE OF QUEENSLAND

2.3.1 Gold Coast City Council (north of NSW border, south of Brisbane)

Status

Wastewater Treatment capacity
- year 1989.....69 ML/d
- projected year 1991.....100 ML/d
- projected year 1993.....107 ML/d
- projected year 2000.....115 ML/d

Sludge produced
- year 1989.....4400 T/yr
- projected year 2000.....7300 T/yr

Wastewater Treatment Plants and Technologies

The Gold Coast is serviced by three extended aeration plants with effluent disinfection by chlorine dioxide followed by pond retention for four days before discharge via ocean outfalls into the South Pacific.

Future technologies will include nutrient stripping, while there is likelihood that, by about year 2000, final treatment to potable quality to allow re-use in this water-short region will be required.

Sludge Handling and Disposal

Dried sludge is now landfilled, but experiments are underway on re-use via composting, which should prove to be feasible since this region has no heavy metal or toxic contaminant problems.

Problems Needing Solutions

The main problems for the Gold Coast will be identifying, testing and acquiring the most suitable technologies to enable the production of potable quality effluent likely to be a political necessity within the next decade.

Opportunities for Suppliers of Services and Equipment

Supply of extended aeration equipment for the 15 ML/s expansion of one of the treatment plants scheduled for post-1992, at an estimated cost of A$15 million.

Supply of nutrient-stripping technology for this plant (capacity 40 ML/d by year 2000), the cost of which has not been determined.

Demonstration of advanced tertiary treatment processes for a potable water effluent re-use system for installation after year 2000. The Gold Coast City Council should be approached to explore these opportunities.

Responsible Official

Chief Engineer, Gold Coast City Council
P.O. Box 5042, Gold Coast Mail Centre, Queensland 4217
Australia
telephone (international): 61 75 319 211
fax: 61 75 319 346

2.3.2 Caboolture Shire (Sunshine Coast, north of Brisbane)

Wastewater treatment capacity
year 1989 .....8 ML/d
projected year 1995.....9 ML/d
projected year 2000.....16 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

Two treatment plants are operated.

The mainland plant is an extended aeration activated sludge system incorporating nitrification/denitrification and coastal river discharge,

The plant on sandy Bribie Island, a growing resort area, also uses activated sludge, but without denitrification, which discharges into infiltration fields to recharge the water-supply aquifer. Potential aquifer contamination has led to an ocean outfall being considered, but because that could lead to lowering the water table and saltwater intrusion, it is likely that advanced treatment with nutrient removal will be needed in the future.

Problems Needing Solutions

Although there is a potential need for advanced treatment at Bribie Island, the problem is not regarded as immediate. Therefore, there are no opportunities other than those which have already been taken up by existing suppliers.

However, potential suppliers could register their interest in future tenders with the official below.

Responsible Officer

The Water and Sewerage Engineer
Caboolture Shire Council
P.O. Box 159, Caboolture, Queensland 4510
Australia
telephone (international): 61 71 950 244
Fax: 61 71 950 188

2.3.3 Caloundra City (on the coast north of Caboolture Shire)

Status

Wastewater treatment capacity
year 1989.....9 ML/d
projected year 1995.....14 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technology

Caloundra, the centre of the Sunshine Coast residential and recreational region, is undergoing explosive population growth. The City presently operates two secondary treatment plants from which chlorinated effluent is discharged into the South Pacific Ocean.

Problems Needing Solutions

The City's consulting engineers have advised Council that the projected population growth will require the removal of nutrients from the effluent, which will also need to be more effectively disinfected than with chlorine, as at present.

Therefore, it is likely that major, but not yet costed, expenditures will soon be required in these areas.

Meanwhile, to cope with the increasing demands on the system, at least 5 ML/d of secondary treatment capacity will be added in 1994/95, at an estimated cost of A$5 million (1989 dollars).

Opportunities for Suppliers of Services and Equipment

Since the City's consulting engineers are also contracted to manage its engineering department, opportunities for outsiders appear to be limited. However, companies wishing to explore their prospects should contact the person below.

Responsible Official

Mr Peter Moses
John Wilson & Partners
82-98 Bowen Street, Brisbane, Queensland 4000
Australia
telephone (international): 61 7 831 7316

2.3.4 Noosa Shire (north of Caloundra, on the Sunshine Coast)

Status

Wastewater treatment capacity
year 1989.....8 ML/d
projected year 2005.....15 ML/d
Sludge produced.....n/a

Wastewater Treatment Plants and Technologies

Noosa, a major, developing tourist region, has one trickling filter plant. It is planned to replace this plant with two state-of-the-art tertiary plants with nutrient removal.

Problems Needing Solutions

There is opposition to a proposed new ocean outfall, which makes likely a decision by council that the new plants will incorporate sophisticated treatment and nutrient removal enabling land-based re-use of the effluent.

Opportunities for Suppliers of Services and Equipment

Long-term and limited to possible equipment supply through the Council's consulting engineers, John Wilson & Partners (see Caloundra, above).

Responsible Official:

The Water and Sewerage Engineer
Noosa Shire Council
Pelican Street, Tewantin, Queensland 4565
Australia
telephone (international): 61 72 495 200

3.0 MAJOR BUYERS AND SUPPLIERS OF EQUIPMENT AND SERVICES

3.1 Buyers of Wastewater Equipment and Services

The major buyers of wastewater treatment equipment and services are the State, City and Shire governments involved in upgrading or enlarging the capacity of treatment plants. The private-sector market that exists for small, package treatment plants in areas that lack regional sewerage services has not been addressed in this report. Such systems will diminish as governments expand their regional services.

Purchases of equipment are usually made through tenders. Most are publicly advertised, but often, not widely. Some are by closed invitation to selected, qualified suppliers. Because tender response times are generally short, it is highly advantageous for interested companies to pre-qualify with government agencies and to have representation by, or joint ventures with, Australian businesses.

Services, usually comprising technical consulting and project management, are supplied either by private-sector engineering businesses or by State government agencies through cost-sharing, financial grant arrangements.

In the previous section of this report, the responsible official(s) for each government jurisdiction in eastern Australia in which there are prospects for Canadian suppliers of equipment and services were identified. For easy reference, those officials are listed below. The page number at which the description of each regional treatment system begins is shown after the region.

3.1.1 STATE OF NEW SOUTH WALES

Sydney (page 5)

The Deputy Managing Director
WATER BOARD: Sydney-Illawarra-Blue Mountains
115-123 Bathurst Street, Sydney 2000
Australia
telephone (international): 61 2 269 6969
Fax: 61 2 264 3668

Hunter District (page 9)

The Contracts Officer, Purchasing Section
Hunter Water Board
P.O. Box 5171B
Newcastle West, New South Wales 2302
Australia
telephone (international): 61 49 267 267

Great Lakes Shire (10)

* The Shire Engineer, Great Lakes Shire Council
P.O. Box 450, Forster, New South Wales 2428
Australia
telephone (international): 61 65 546 277
fax: 61 65 554 672

* The Chief Engineer, NSW Public Works Department
State Office Block, 74-90 Phillip Street
Sydney, NSW 2000
Australia
telephone (international): 61 2 228 4444
fax: 61 2 251 517

Coffs Harbour City (11)

* The City Engineer, Coffs Harbour
P.O. Box 155, Coffs Harbour, New South Wales 2450
Australia
telephone (international): 61 66 522 555
fax: 61 66 521 517

* The Regional Manager, North Coast Region
NSW Public Works Department
186 Molesworth Street, Lismore, New South Wales 2840
Australia
telephone (international): 61 66 211 672
fax: 61 66 214 920

Tweed Shire (page 12)

* The Shire Engineer, Tweed Shire Council
P.O. Box 816, Murwillumbah, New South Wales 2484
Australia
telephone (international): 61 66 720 400
Fax: 61 66 724 598

* The Regional Manager, North Coast Region
NSW Public Works Department
186 Molesworth Street, Lismore, New South Wales 2840
Australia
telephone (international): 61 66 211 672
fax: 61 66 214 920

3.1.2 STATE OF VICTORIA

Melbourne (page 14)

Assistant General Manager Systems Development
Melbourne & Metropolitan Board of Works
625 Little Collins Street
Melbourne 3000
Australia
telephone (international): 61 3 620 0221

Non-metropolitan (page 16)

Senior Engineer
Department of Water Resources Victoria
2nd Floor
35 Spring Street, Melbourne, 3000
Victoria Australia
telephone (international): 61 3 651 3917
Fax: 61 3 651 3989

3.1.3 STATE OF QUEENSLAND

Gold Coast City (page 18)

Chief Engineer, Gold Coast City Council
P.O. Box 5042, Gold Coast Mail Centre, Queensland 4217
Australia
telephone (international): 61 75 319 211
fax: 61 75 319 346

Caboolture Shire (page 19)

The Water and Sewerage Engineer
Caboolture Shire Council
P.O. Box 159, Caboolture, Queensland 4510
Australia
telephone (international): 61 71 950 244
fax: 61 71 950 188

Caloundra City (page 20)

Mr Peter Moses
John Wilson & Partners
82-98 Bowen Street, Brisbane, Queensland 4000
Australia
telephone (international): 61 7 831 7316

Noosa Shire (page 21)

The Water and Sewerage Engineer
Noosa Shire Council
Pelican Street, Tewantin, Queensland 4565
Australia
telephone (international): 61 71 495 200

3.2 Buyers of Sludge Disposal Equipment and Services

Except in major population centres, sludge disposal is not regarded by sewage treatment authorities as a problem that needs addressing. The exceptions among the regions covered in this report are Sydney (NSW), Melbourne (Vic), the Hunter region (Newcastle, NSW), and the Gold Coast (Qld).

The market for sludge handling, treatment and disposal equipment and services received a major boost when, in November 1989, the Sydney Water Board called for tenders to dispose of its sludge (44,000 tonnes per year in 1989, projected to rise to 95,000 by the year 2000).

Progress in Sydney is being watched closely by other jurisdictions, and its initiatives could be copied elsewhere, creating a market for equipment and services.

If such markets are established, the buyers will be the same as listed for wastewater treatment systems.

3.3 Suppliers of Wastewater Treatment Equipment

The major suppliers of equipment to wastewater treatment agencies in eastern Australia are listed below. This list is meant neither to be in order of preference nor is it comprehensive, since tenders are awarded by agencies according to their own criteria. All businesses listed are potential joint-venture partners for Canadian companies.

Aquatec-Maxcon Pty Ltd
8 West Street, North Sydney NSW 2060
Australia
telephone (international): 61 2 957 4077
fax: 61 2 957 5579
Specialists in aeration systems and suppliers of processes for residential and industrial wastewater treatment.

Jord Engineers Pty Ltd
11 Atchison Street, Crows Nest NSW 2065
Australia
telephone (international): 61 2 439 7700
fax: 61 2 439 1945
Design, fabrication, construction, and maintenance of plant and equipment.

Smith & Loveless Australasia Pty Ltd
P.O. Box 727, Bankstown NSW 2200
Australia
telephone (international): 61 2 709 3566
fax: 61 2 709 5667
Design and installation of wastewater treatment systems including pressure and gravity aeration, ion exchange, and other specialised applications.

Warman International
1 Marden Street, Artarmon NSW 2064
Australia
telephone (international) 61 2 436 6701
fax: 61 2 436 6701
Supplies a wide range of sewage and water treatment equipment.

William Boby & Co (Australia) Pty Ltd
P.O. Box 117, Brookvale NSW 2100
Australia
telephone (international): 61 2 938 4666
fax: 61 2 938 6569
Supplies and installs equipment for potable water, sewerage, and industrial effluent treatment plants; and incineration and odor control equipment.

Mono Pumps Australia Pty Ltd
P.O. Box 213, Sutherland NSW 2232
telephone (international): 61 2 521 5611
fax: 61 2 542 3649
Equipment and system design services; contracting, installation, and commissioning services.

MEMTEC LTD
1 Memtec Parkway, Windsor NSW 2756
Australia
telephone (international): 61 45 776 800
fax: 61 45 776 804
Manufacturers and distributors of microfiltration and reverse osmosis systems; ultraviolet purification systems; and ion exchange resin systems.

3.4 Suppliers of Wastewater Treatment Services

In addition to supplying the range of products listed, the above companies supply related services. Others providing services in the wastewater treatment market throughout eastern Australia are listed below. Most supply the same range of services: feasibility studies and management advice; environmental impact assessments; process engineering; project design and documentation; project management, construction and administration; plant installation and operator training; performance evaluation and troubleshooting.

Patterson Britton & Partners Pty Ltd
Consulting Engineers
P.O. Box 515, North Sydney, New South Wales 2059
Australia
telephone (international): 61 2 957 1619
fax: 61 2 957 1291

Scott & Furphy Group of Companies
Box 7083, St. Kilda Road P.O., Melbourne, Victoria 3004
telephone (international): 61 3 267 2800
fax: 61 3 267 4903

Gutteridge, Haskins & Davy Pty Ltd
39 Regent Street, Sydney, New South Wales 2000
Australia
telephone (international): 61 2 690 7070
fax: 61 2 698 1780

Sinclair Knight and Partners Pty Ltd
1 Chandos Street, St. Leonards, New South Wales 2065
Australia
telephone (international): 61 2 436 7222
fax: 61 2 438 4794

Fisher, Stewart Pty Ltd
2 Downes Place, Geelong, Victoria 3220
Australia
telephone (international): 61 52 221 633
fax: 61 52 614 527

Kinhill Engineers Pty Ltd
437 St. Kilda Road, Melbourne, Victoria 3004
Australia
telephone (international): 61 2 267 5911

Scroggle
502 Albert Street, East Melbourne 3002
telephone (international): 61 3 666 1333
fax: 61 3 744 3233

John Wilson & Partners Pty Ltd
82-98 Bowen Street, Brisbane, Queensland 4000
Australia
telephone (international): 61 7 831 7316

4.0 APPLICABLE DUTIES OR TARIFFS

According to the Australian Customs Tariff Guide (issued March 1988, and updated regularly) there are no charges imposed specifically on inputs to the sewage treatment industry. However, in such cases, a charge up to 20% of the value of the components of treatment systems entering Australia could be levied.

5.0 CONFERENCES, TRADE SHOWS AND EXHIBITIONS: 1990/1991

Two conference/trade show events have been identified to be held in Australia during 1991. One is the AWWA biennial conference to be held in Perth, Western Australia, from 17-22 March 1991. There will be 30 product display booths available to the first applicants, who should contact the:

AWWA Convention, Perth, Western Australia 6000
telephone (international): 61 9 447 6550
fax: 61 9 448 6997

The second event, Environment '91, is to be held at Sydney's Darling Harbour Convention and Exhibition Centre 16-19 May 1991. The organiser is:

Conference & Exhibition Organisers Pty Ltd
PO Box 314
Carlingford NSW 2118
telephone (international) 61 2 872 6255
Fax: 61 2 872 6879

6.0 TRADE PUBLICATIONS

The Australian Water & Wastewater Association (AWWA) publishes the Journal Water (Editor, E.A. (Bob) Swinton; telephone 61 3 560 9306).

The Association also produces its Handbook, which is a reference to the industry in Australia. It can be obtained by contacting:

AWWA, P.O. Box 460, Chatswood, New South Wales 2057
Australia
telephone (international): 61 2 413 1288

7.0 Canadian Trade Offices in Australia:

Canadian Consulate General
Level 8, AMP Centre
50 Bridge Street
Sydney NSW 2000
Fax: (02) 223 4230

Canadian Consulate
Level 6
1 Collins Street
Melbourne VIC 3000
Fax: (03) 650 5939

AUSTRALIA

Area	7,682,300km²
STATES	**POPULATION**
New South Wales	5,544,000
of which Sydney	3,392,000
Victoria	4,165,000
of which Melbourne	2,917,000
Queensland	2,593,000
of which Brisbane	1,157,000
South Australia	1,373,000
of which Adelaide	987,000
Western Australia	1,441,000
of which Perth	1,001,000
Tasmania	446,000
of which Hobart	178,000
Northern Territory	148,000
of which Darwin	68,000
Australian Capital Territory	265,000
of which Canberra	265,000
Total Population:	approx 16,000,000

Canadian Exports to Australia	
Visible	850 million CAD
Services	175 million CAD
Australian Exports to Canada	
Visible	550 million CAD
Services	60 million CAD
Australian Investment in Canada	1.5 billion CAD (1988)
Canadian Investment in Australia	3.3 billion

	Exports (billion CAD)	Imports
Food & live animals	8.1	1.4
Crude materials	9.0	1.1
Chemicals	0.5	3.0
Mineral fuels	8.0	2.0
Manufactured goods	3.3	5.7
Machinery	1.7	15.2
Total	33.0	35.0
Imports/Exports	**To**	**From**
Asean	7%	5%
China	5%	5%
EEC	14%	24%
Japan	28%	24%
USA	10%	21%
Canada	1.5%	2%

Climate	Tropical (39%) and Temperate (61%)
Languages	English
Weights & Measure	Metric
Electrical Power	220V 3 Phase 50Hz
Average Earnings (1987)	CAD400 per week
Principal Crops	Wheat, Barley, Oats, Grain, Sorghum, Sugar cane
Motor Vehicles	9 million
GDP (1988)	CAD240 billion